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## THE PREHISTORIC MOUNDS OF EASTERN TURKEY

BY ELLSWORTH HUNTINGTON

THE Turkish Empire is at the same time one of the best known and one of the least known countries in the world. Even now certain areas are only partly explored, especially the mountain region north of the Euphrates and Tigris rivers. This district is yielding rich archæological rewards to the few travellers who visit it, as is well shown by the work Dr. Belck and Prof. Lehmann whose explorations during the past few years have brought to light the connected history of the Vannic tribes, the Näiri as the Assyrians called them, the Haldis as they called themselves. These people, who from the X to the VIII centuries before Christ were the unconquerable scourge of their southern neighbors, the Assyrians, occupied nearly the same country that is now known as Armenia, and was earlier the home of a race of mound-builders.

West of the Haldis, beyond the Euphrates river lived the Hittites, the supposedly Turanian or possibly Hamitic people, who, about a 1,000 years before our era, formed a mighty empire whose sway stretched far over Asia Minor and Syria. Archæologists have yet been able to do practically nothing toward investigating the burial treasures of either the Hittites or the Haldis* nor of their probable predecessors, the early mound-builders.

During the years 1899 to 1901 I visited a number of the mounds in the eastern part of the Hittite country and the western part of the Haldi country.† If we exclude such places as Eyuk where the mound clearly covers an ancient temple or palace, the mounds are divisible into two classes, the first being conical on hills or mountains commanding a wide view, the second truncated cones located on the plains. The first seems to be confined to the Hittite country west of the Euphrates, the second are most abundant in the Haldi country but the two kinds occur together and cannot always be sharply distinguished.

*See Lynch, H. B. *Armenia*, vol. ii, p. 61 ff. and numerous references to the writings of Messrs. Belck and Lehmann as given by Lynch, p. 64.

†The district traversed was about 300 miles east and west from Palu to Yozgat, and 250 north and south from the Black Sea to the edge of the great southern plains.

The conical mounds are in general more easily visited than are the others because they are located farther west and nearer to the sea. A few miles south of the port of Samsun where the mountains slope gently upward from the Black Sea, every traveller along the high road to the interior must notice two of them surmounting the hill-top and rising at an angle of perhaps 45°, so steeply at least that they can with difficulty be climbed. From a distance they seem to be perfect cones, so placed as to command a wide view toward the land and the sea including the old town and fortress of Kara Samsun 3 miles away near the sea. No others appear in this vicinity, but near Marsovan, 55 miles southwest, where the first of the great series of elevated inland plains begin, numerous mounds are found, some of which are conical and are located on hills, while others are on the plains, but none of them seem to be particularly characteristic. Others are seen in the plain of Chorum farther in the same direction; and at Kala Hissar, 100 miles south-west of Samsun, near Eyuk are two more similar in shape, size, and location to those first mentioned. Eyuk and its neighbor, Boghaz Keui, it will be remembered, are thought to mark the northern capital of the great Hittite Empire. They are famous for their bas-reliefs showing long processions of figures clad in tunics, pointed caps, and shoes with upturned toes. The Hittites found at Kala Hissar a splendid conical mass of rock which rises precipitously 400 feet from the level upland plain, and on which they built an almost inaccessible fortress. The rock is covered with "Hittite cuttings" in the form of steps, platforms, holes, troughs and seats, and on the sides are ruined walls. The top commands a wide view to the north, west, and south, but not toward the south-east, east and north-east, where the view is cut off by a line of hills from 1 to 2 miles distant. The two mounds lie on these hills seemingly about a mile apart, and between them command a view of all the region not seen from the fortress. The one nearer to this is 40 feet high, perfectly circular in plan, and in vertical section conical except that the top is slightly rounded. The material is soil and gravel composed of pebbles of such rocks as are found in the vicinity. My companions and I could detect no special structure, nor could we find pieces of pottery or implements although we looked for them carefully.

The next mounds noted were about 50 miles south-east of the Kala Hissar between Yozgat and Karamaghara. Five hours—18 miles, east of the former place on the short bridle path to Ak Dagh Moden,—the wagon road goes further north,—is Kerkeniz Kala, which seems to be a Hittite fortress of the same type as Kala Hissar. For 20 miles east of here stretches a narrow fertile plain from 3 to 6 miles wide, bordered on either side by a line of low mountains capped with two rows of conical mounds like those near Samsun and Kala Hissar. On each side I counted 7 or 8 placed at approximately equal distances, always in sight of one another, and commanding wide views of the surrounding country. Wishing to learn the local tradition about them, I asked a Turkish official for what purpose they were built.

"Why, don't you know?" was his reply, "They are part of the old fire-telegraph from Bagdad to Constantinople." He may have been partly right as to their purpose, although the connection between the two great cities is somewhat apocryphal. Apparently they were built as posts of observation, communicating with the castle and protecting the plain which they inclose, just as those at Kala Hissar, and perhaps Samsun also seem to have

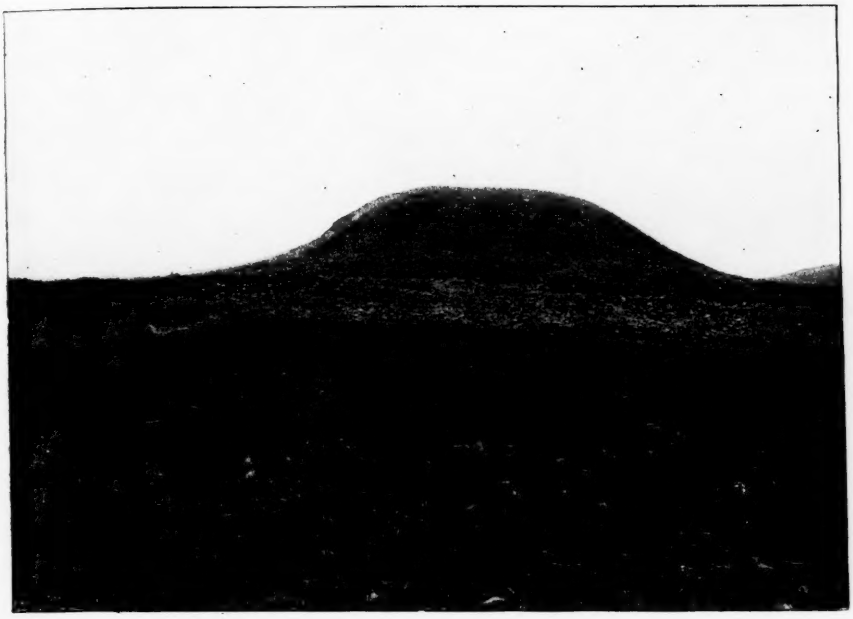


FIGURE 3. , THE MOUND AT KOKH FROM THE NORTH

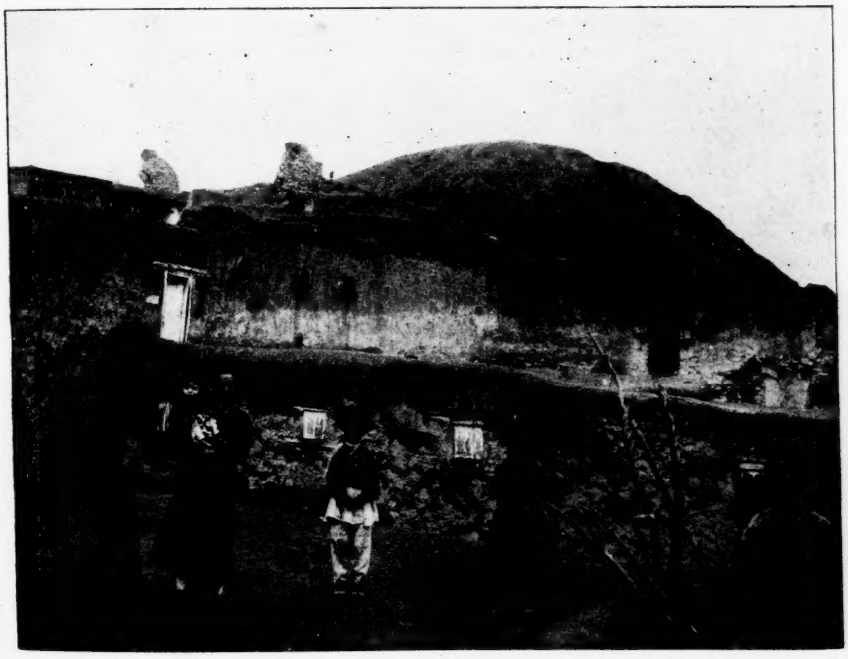


FIGURE 4. NORTH SIDE OF THE MOUND AT TADEM SHOWING ARMENIAN CHILDREN AND HOUSES IN THE FOREGROUND, AND PART OF THE ROMAN WALL ON THE LEFT ABOVE

been built for the purpose of overlooking the region which is not in sight from the castle, and thus giving the defenders a virtual outlook over the whole country.

If our supposition is correct, the mounds are connected with the castles and hence are of Hittite origin, provided the castles themselves are Hittite, but this is merely a suggestion not a theory. In western Asia Minor are many Thraco-Phrygian mounds of similar structure but less striking location, which show signs of having been places of burial.* Those which I have described may have served the same purpose, or, indeed, it may have been the custom to bury famous men on hill-tops which were also posts of observation.

The truncated, unsymmetrically conical mounds of the second class occur in the Hittite country, but are much more numerous and important in the Haldi country, where they are found on almost every plain from Malatia to Van, 300 miles farther east. They are strictly confined to the plains and seem to be found only on the great central plateau which is bounded on the north by the Pontic range and on the south by the Taurus range. They are very abundant in the region of Harput in the great bend of the upper Euphrates river where about 15 are located in the Harput plain within an area 25 miles east and west by 6 miles north and south. It is to these that we shall devote most of our attention since they have been examined more carefully and seem to be typical of the others. The majority are near the edges of the plains where springs flow out from the mountains, although a fair number are situated close to the main streams, and a few are scattered here and there. It is interesting to note that usually the villages located on, or more often near the mounds are inhabited by Armenians or occasionally Kuzzlebash Kurds, who are often merely renegade Armenians, although neighboring villages belong to Turks and genuine Kurds. Probably the Armenians, when they came into the country took the most fertile or best watered parts of the plain just as the mound-builders had done in earlier times.

In shape the mounds are quite uniform; the plan is circular or slightly elliptical and the slopes at the ends of the longer axis are unsymmetrical, one slope being nearly twice as steep as the other. [See Figs. 3 and 4.] The tops, which are of nearly the same shape as the bases, are almost flat but slope slightly upward from the side where the ascent is gentler to the edge of the steeper side. [Fig. 2.] In size they vary from 1 to 6 acres, and in height from 30 to 80 feet. In two of the largest, viz. at Ichmeh and at Telanzit [Fig. 7], the largest of all, a slight terrace is visible on the side about 15 or 20 feet above the base. The internal composition of the mounds is not clearly seen in most cases, but at Tadem and Hokh nearly perpendicular sections are exposed.

At Tadem [Figs. 2 and 4] the villagers have cut away part of the mound in order to use the soil in building their mud houses, the whole structure is seen to consist of alternate layers of fine soil and small irregularly placed, often angular stones, the layers of soil being of varying thickness, but always far thicker than those in which stones predominate and which are disjointed and irregular. Bits of charcoal and, in some cases, thin layers which extend but a few feet are found here and there, and in one place a quantity of carbonized grain was dug out. In dry weather the surface of

*Kretschmer: *Einleitung in die Geschichte der griechischen Sprache.*, p. 174 ff.

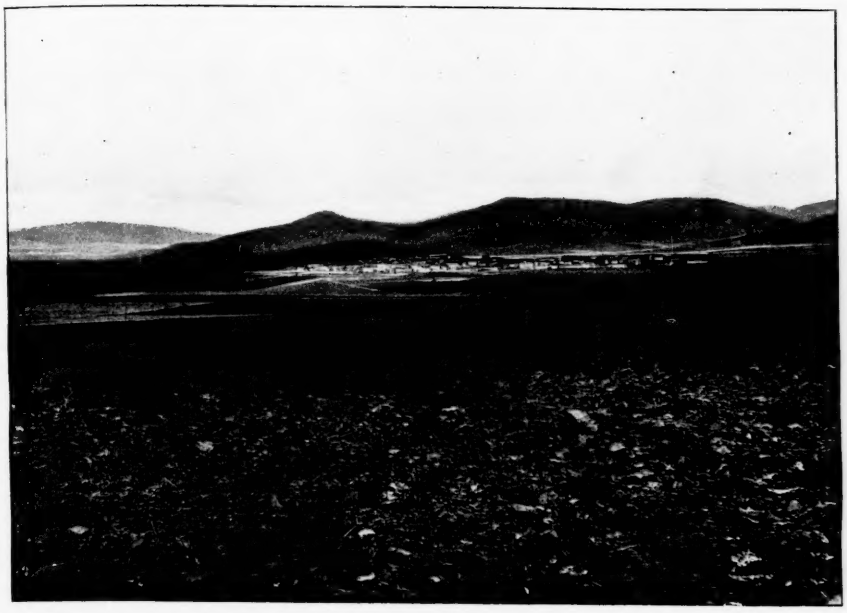


FIGURE 5. THE VILLAGE OF GARMURI ON THE EDGE OF THE HARPUT PLAIN. THE VILLAGE IS LOCATED ON AN ALMOST DESTROYED MOUND, THE REMAINS OF WHICH CAUSE THE CENTRAL HOUSES TO STAND HIGHER THAN THOSE ON THE OUTSKIRTS. LOOKING EAST

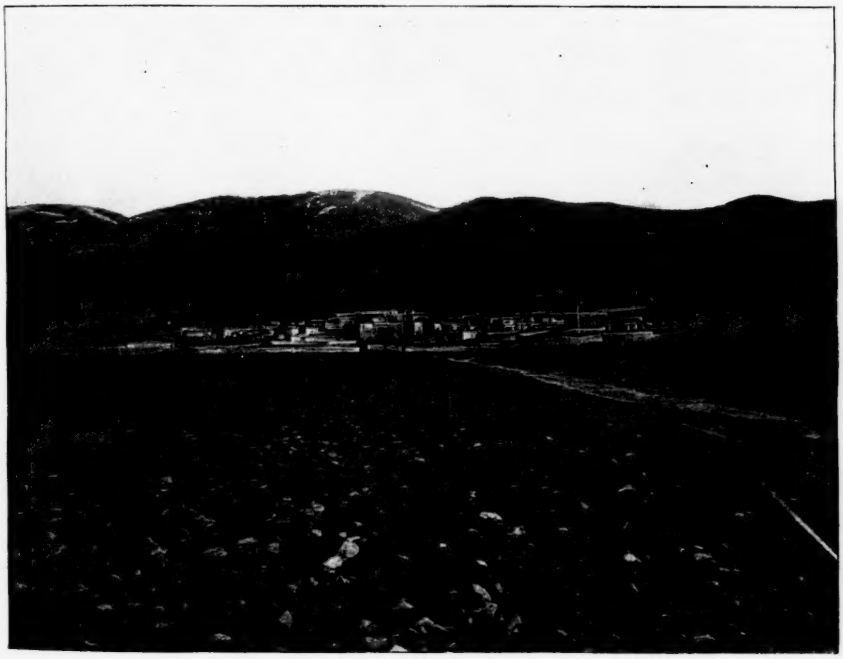


FIGURE 6. GARMURI FROM THE NORTH

freshly opened portions is white with a deposit of potassium nitrate suggesting that the mounds contain a large amount of organic matter. Indeed, the soil of the mounds is so rich and so beneficial to crops that the villagers say that it is as good as the best manure. If the country had been inhabited by a more energetic, progressive race, these memorials of the past would long ago have been spread over the fields and lost.

At Hokh [Figs. 1 and 3] the top of the mound is 80 feet above the little brook which has undermined it somewhat at the foot of the steeper side, and although large at the base, the flat top is only 200 feet in its longest diameter. In structure this mound is like that at Tadem with the exception of one feature. Near the bottom is a bright red layer several feet thick and higher up there are two or three thinner layers all of which look as though they might be layers of brick which have partly decomposed under the influence of the weather. The villagers say that they find in the mounds red bricks about 12 inches thick. I found only small fragments which may possibly be of later date than the red layers.

Implements of stone and bone are found in most of the mounds, although those made of bone are much less common and I have personally found but one, a well polished knife. Many of the numerous stone implements are highly polished and are all carefully smoothed. The most common forms are hammers and axes, [Fig. 8] some perforated and others smooth. Pitted stones, well rounded and symmetrical, but rarely completely perforated, are very abundant, and rubbing-stones and pestles are sometimes found. There is also a curious knuckle-shaped tool whose use is uncertain. All the implements are made of trap or fine granite rocks, as no flint occurs in the region. In the mound at Ichmeh a battered bronze knife is reported to have been found. The only other articles of undoubted prehistoric origin which I have seen in the mounds are countless bones and bits of coarse pottery, sometimes an inch thick.

The mound at Garmuri [Figs. 5 and 6] has been almost destroyed by the villagers, whose houses are all built on and of it, and who make excavations every year in order to build new houses or repair old ones. In 1900 two skulls are said to have been found tied together, and several "coffins" were dug up. These I could not see because the superstitious villagers at once break such things to pieces, but two of them were described to me by an intelligent young villager, a student in Euphrates College, the American school at Harput. One was a red jar about 18 inches long and contained the bones of a little child: the other consisted of two large jars placed mouth to mouth with the bones of a man inside. They seem to be just such coffins as are found in the old "tells" of Babylonia.

During the Roman period or later many of the mounds appear to have been utilized as sites for forts or other massive buildings. At Tadem, for instance, the whole mound, 60 feet high and 300 feet in diameter, was surrounded by a wall 10 feet thick made in the most substantial manner with lime mortar, but as the stones have been carried off for use in building houses only small sections now remain. [Figs. 2 and 4.] On top of the mound are evidences of some sort of superstructure made in the same massive style as the walls, and with a hole dug down some distance in the middle of the ruin. The villagers say that they dug until they found a stair-case leading down into a dark room which they feared to enter, and so shovelled the earth back over the stair-case. In the neighborhood are a few

FIGURE 7. MOUND BETWEEN TELANZIT AND KHOZEGDEG FROM THE WEST SIDE

other ruins, one of which seems to be the floor of a Byzantine church, now wholly buried, and covered by a grain field. [See Fig. 8. Nos. 2 and 15.] At Kalushaghi a mound of equal height and greater extent is inclosed by a similar wall, but no part of the interior was examined to see whether pottery and stone implements could be found which would prove its prehistoric origin.* On top of the mounds ruined superstructures are found at Hokh, Ichmeh and Telanzit where, as at Tadem and Kalushaghi, Roman coins are occasionally unearthed.

An interesting suggestion of the conditions under which the mound builders lived is given by a small insignificant mound at Ellimelik, ½ mile from the Euphrates river. Its shape is less regular than that of the larger mounds and one side has been undermined by a mill-race so as to expose a vertical section which everywhere, from top to bottom, contains bits of pottery. Twelve feet from the base is a level layer of fine water-rolled gravel 2 inches thick which seem to extend across the whole mound and could only have been deposited in a fair sized body of water having considerable movement, either because of current or waves. Above it are 18 feet more of soil and fragments of rock and pottery. Apparently after men had occupied the mound long enough to build it up to a height of 12 feet, some body of water covered it, deposited the layer of gravel and perhaps some finer material and then retired, after which men again occupied the site and added 18 feet more of material. What the cause of this inundation was we cannot say with certainty, nor is one isolated example a broad enough basis for generalization. One thing at least is certain: the geographical

*_Verhandlungen der Berliner anthropologischen Gesellschaft._ 1900 p. 142.

conditions of that time were different from those of the present. The narrow valleys cut in the bottom of old valleys, the side streams cascading into the main stream, and the shape of the great canyon of the Euphrates river all seem to show that in very recent times, geologically speaking, the region 20 or 30 miles to the south, where the Euphrates river has cut its great gorge through the Tarus mountains, was warped and elevated in such a way that the river could not always cut down its channel as fast as the mountains rose.* Hence the basins along the upper course of the river were in part converted into lakes the level of which fluctuated according as the uplifting or erosive forces prevailed in the canyon. We may possibly find, as our knowledge of the country increases, that man lived on the earth during the last of these changes, and the mound at Ellimelik may have stood on the edge of one of the last lakes.

The purpose of these truncated conical mounds is not fully understood, nor do we know exactly who made them. Dr. Belck,† who found a large number in the plain of Mush, thinks that they are the places of burial of the earliest Armenian kings, and bases his argument on the fact that they are most abundant in that plain which Armenian tradition designates as the first home of the Armenians. As a matter of fact they are equally abundant and of much larger size in the plain of Harput, so that the argument falls to the ground. It is certain, however, that the mounds were places of burial, although they may have served some other purpose also; and it is not impossible that they were built by the ancestors of the Armenians. The earliest known inhabitants of this region are the so-called Tharco-Armenians who probably came from the Balkan peninsula and spread through Asia Minor in the second and third millenniums before Christ. Another branch of this Aryan stock, the Thraco-Phrygians, are supposed by Kretschmer [See ante p. 166] to have built the small mounds of western Asia Minor; while the Thraco-Armenian branch came further east and may possibly have built the mounds which we have been considering. Other suppositions are, however, possible, and we have seen that there may be a connection between the mound-builders and the builders of the so-called "Hittite castles." Until the mounds are more fully investigated we can only conjecture as to who were their builders.

We can, however, be reasonably certain that the mound-builders were to some extent influenced by their neighbors in Babylonia or Assyria, or else immigrants from those countries invaded the northern region. This is shown by the layers of brick in the mound at Hokh, and by the coffin jars at Garmuri, both of which are distinctly characteristic of the Babylonian mounds. The method of burying the dead in two jars placed mouth to mouth was common only among the earliest inhabitants of Babylonia; and the finding of such jars is an indication that the mounds of Armenia were built at least 2000 years before Christ. In connection with this Babylonian influx it is interesting to note that its influence seems to be confined to the place where the Tarus range is narrowest and most easily crossed. It is very easy to come from Mesopotamia up the Tigris valley to Lake Gyuljuk and thence into the Harput plain; and just where this easiest road enters the plains of Armenia we find not only the largest mounds, but those which show signs of the culture of the south.

*_Geographical Journal_, 1902. The Great Canyon of the Euphrates River.
†See _Verhandlungen Berliner anthrop._ Gesel. 1899. p. 663.

Although the conical mounds on the hills in the country of the Hittites may possibly have been built by that people, and are well worth study, those on the plains especially in the Haldi country, are far more important. Their location in the best parts of the plains where now the Armenians have settled, their regular shape, flat-toppped and unsymmetrically conical, their large size, the implements of stone and bone, the pottery and coffins, the more recent additions, the physical conditions of the country at the time of their building, their purpose, the race of their builders, and the influence of the Babylonians all furnish fruitful fields for further exploration. Much remains to be done in the way of examination of the parts that are now exposed to view; and when the mounds are excavated who knows how much they may tell of the early dwelers in this historic land?

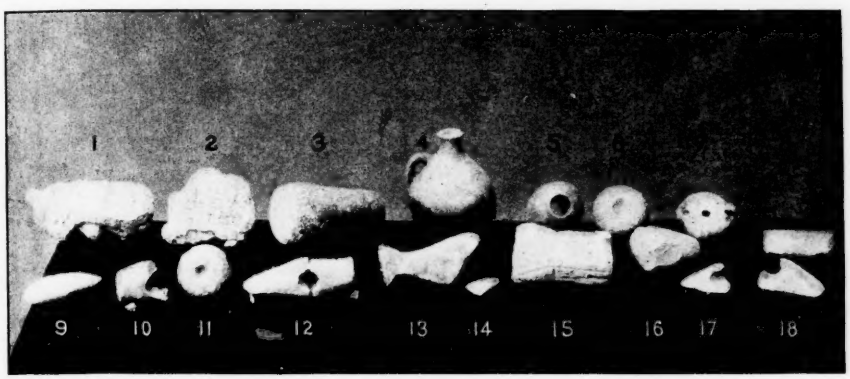



FIGURE 8. STONE IMPLEMENTS AND OTHER ARTICLES FROM THE MOUNDS OF THE HARPUT PLAIN, NOW IN THE MUSEUM OF THE EUPHRATES COLLEGE, HARPUT, TURKEY

1. Stone salt-cellar. Garmuri; 2. Bit of stone mosaic from the floor of a Byzantine (?) church near Tadem; 3. Stone pestle. Garmuri; 4. Earthen jug (possibly modern). Garmuri; 5, 6 and 11. Pitted Stones. Garmuri and Hokh; 7. Stone lamp. Garmuri; 8, 9, 10, 12, 14, 16, 17, 18 Stone hammers and axes. Garmuri, Hokh, Tadem; 13. Knuckle-shaped stone implements. Hokh or Garmuri; 15. Carved stone from a Byzantine (?) church. Tadem; 1, 2, 4 (?), 7 and 15 do not belong to the prehistoric period.
[Photographed by Mr. Garabed Soghigian.]

FIGURE 1. THE TEMPLE AT THE BASE OF MAGA-LAKKOS. THE PLATEAU OF THERMOS WITH MT. PANAITOLIKON AND KEPHALOVRYSIS

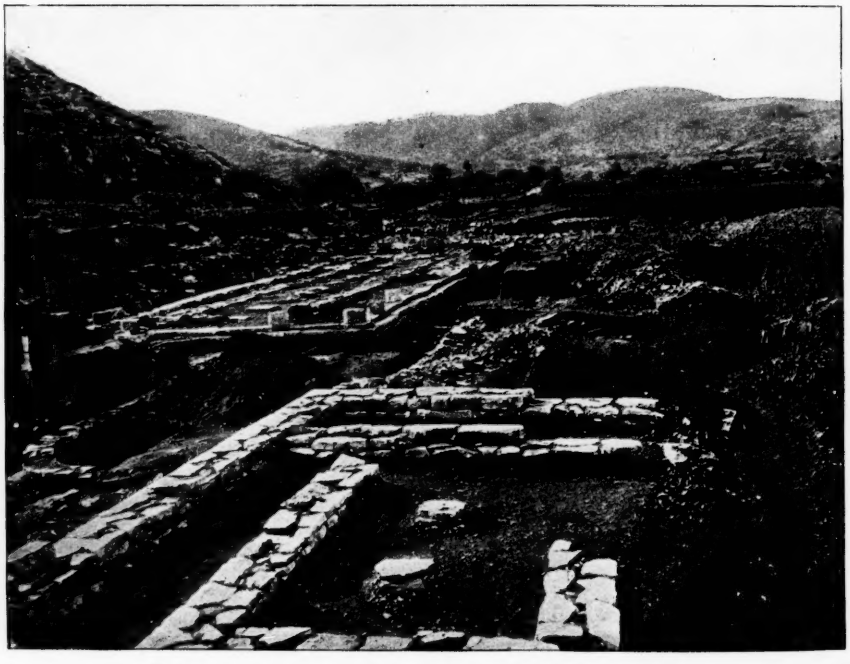


FIGURE 2. THE TWO TEMPLES WITH THE ELLIPTICAL BUILDING

# THE GREEK EXCAVATIONS AT THERMOS

BY GEORGIOS SOTERIADES

*Ephor of Antiquities, Thermos, Greece**

FROM a passage of Strabo [X, 3, p. 463], and from various passages of Polybius, especially from the fifth book of the latter [chs. 6, f.], it has been known that Thermos (Strabo calls it Therma, as does Polybius once, in V, 6, 7) was the political and religious centre of the Ætolian league, which flourished in the III and in the beginning of the II century before Christ.

Archæologically, however, Thermos had stirred the interest of no investigator until 1897.

Indeed there was uncertainty even as to its location. Since it was commonly regarded a city, some thought it most appropriate to identify it with the acropolis, a little distance from the present Agrinion, which rises to a height of 600 meters and is named today Vlochós. The walls of this acropolis are very strong, 3 meters thick and of very massive stones, and have a circuit of about 4 kilometers (2½ miles). But in fact this city is Thestieis, as I was assured by an inscription which I found there.

Now the careful reading of the account of Polybius in book V, ch. 6 will convince any one: 1, that Thermos was not a city but a place; 2, that it was situated not at Vlochos but at the eastern end of Lake Trichonis. Investigation on the spot had persuaded me already in 1896 that this place was certainly the quite spacious, well-planted and well-watered plateau which extends between the villages of Petrochóri and Kephalóvrysis. In the eastern part of this plateau at the base of the mountain Mega-Lakkos the existence of ancient ruins had been noted by travelers. These ruins formed a quadrangular enclosure 340 meters in length and 200 in width (1115½ x 656 feet). The walls built of massive stones are preserved to the height of a man and have a width of 2.50 meters. Figures 1 and 2 show stretches of the plateau with the village of Kephalóvrysis (to the north), the heights to the south, and the northern line of the walls of the enclosure.

This enclosure, according to the statements of Polybius, included temples, particularly a temple of Apollo, porticoes (stoas) and certainly many other public and private buildings. For here were held the annual general assemblies and festivals of the Ætolians. Here the conventions of the league met and the elections of magistrates took place. The place was most wealthy, for the Ætolians deposited here, as in a safe citadel, whatever valuables they had. Polybius notes especially the costliness of the monuments; he mentions 2000 statues which the Macedonians overthrew, when they captured Thermos. For Thermos twice suffered an attack of the Macedonians in the reign of Philip V, in 218 and 206 B. C. Philip burned up and overthrew whatever he found here; he spared not even the temples.

*Translated from the Greek by Arthur Stoddard Cooley, Ph.D.

When in 1897, at the expense of the Greek Archæological Society, I undertook the first trial excavation, the whole sacred precinct was covered with plowed fields and meadows. Only in a ruined chapel near by were seen a few ancient hewn stones. But in the southern part of the precinct could be distinguished a rather extensive structure of great length. This was named by the inhabitants of the region Palaiobazáro (the old Bazar).

I began the excavation on the eastern side. This work uncovered the foundation of a long portico, 173 meters (568 feet) in length. This preserves in many places its 5 steps. The columns were Doric, of porous stone with a coating of white plaster, but only a few drums and capitals have been preserved. The portico has a width of 13 meters (42⅔ feet). Most probably it had a double row of columns, but the inner part is still covered by a field.

In front of this portico were found, very close to one another, bases of statues and exedrae. But at the southern end of the portico two large buildings with gateways enclosed a broad square. In front of these buildings, again, close to one another stand bases of statues, many indeed equestrian. Beside them were found different fragments of the bronze statues, especially fingers, the hoof of a horse and such things. Since also a second series of bases is being excavated today parallel to the first, one easily understands how the 2000 statues which Polybius mentions could in fact adorn this splendid place.

All these buildings must be supposed to belong to the III century B. C., because it is exceedingly doubtful if the Ætolians before this century had the means to develop at Thermos such activity in building. And the inscriptions, as many as have been preserved on the bases of the statues, are all of the III century and mostly of its second half. These inscriptions are decrees of *proxeny* name of the man to whom the statue was erected. On one base is inscribed also the name of the artist who made the statue, ΗΡΑΚΛΕΙΔΗΣ ΕΠΟΕΙ (Herakleides made it). On another is ΛΥΣΙΠΠΟΣ ΕΠΟΗΣΕ (Lysippos made it). If this name refers to the great Lysippos. then even in the IV century B. C.—and indeed before 320—there were not lacking in the precinct of Thermian Apollo most beautiful monuments of art.

These ruins which were uncovered established the credibility of the quite clear statements of Polybius about the buildings of Thermos. But those found later cast unhoped-for light on the much older history of Ætolia, a history absolutely unknown from the historians. And they also illuminated a hitherto dark chapter of the archaic art of Greece in both sculpture and painting.

All these finds were furnished by the temple, which was discovered in the north-east corner of the precinct and immediately at the base of Mega-Lakkos. Figure 1 shows two temples. Of the smaller no account will be given, for of it nothing has been preserved but the walls seen in the picture. The larger is surely the temple of Apollo. I judge this from two inscriptions found within it. No other temple has been found in the precinct; perhaps, indeed, there never was another.

The temple was covered in part by a very light stratum of good soil which was ploughed in part by a deep accumulation and particularly by great heaps of broken stones. When the soil was cleared away, the entire plan of the temple was presented, as appears in the illustration.

FIGURE 3. THE FOUNDATION (STEPS) OF THE PORTICO

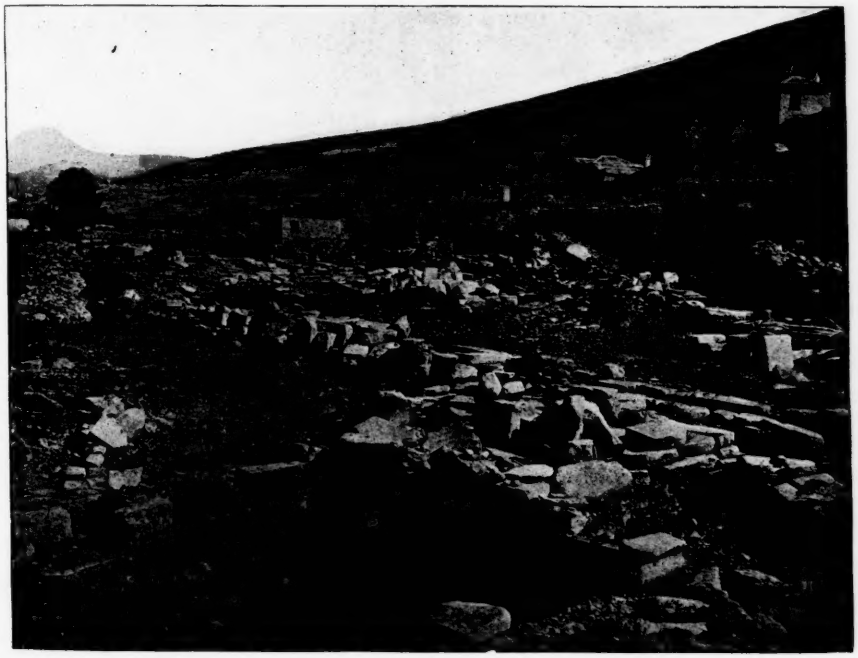


FIGURE 4. THE RESERVOIR. ABOVE, THE TEMPLE AND HOUSES OF THE CUSTODIANS AND THE EPHOR

It is a Doric peristyle temple with 15 columns on the long sides and 5 on the narrow ends. Its length is 38 meters (125 feet) and its breadth 12 (39½ feet), the orientation being exactly from south to north. The cella is narrow (4.60 meters = 15 feet) and long (28 meters = 87 feet). No pronaos can be made out, but there is an opisthodomos. The cella has throughout its length and down the middle a row of 10 columns. The entrance, from the south, had two doors, one on either side of the column.

This plan is very closely akin to that of the most ancient temples of Selinous. The columns in the centre of the cella the temple of Thermian Apollo has in common with the temple of Neandria (of the VII century), with the older of the two temples of Locri and with the enneastyle temple of Paestum (the so-called "Basilica"). Its orientation toward the south it has in common with the Etruscan temples.

Yet a close examination of the stones of which the stylobate and the walls of the cella consist proved that all these were taken from destroyed monuments of the III century. Others had cornices such as stones of other monuments of Thermos from the same III century have, and all these are turned upside down and broken. Beside this neither the stylobate nor the walls of the cella have properly a foundation, but both consist of one tier of stones or two at the most. Only the western stylobate has one step and a leveling course (euthynteria). The existing drums of the columns which appear in the picture have only a few very shallow flutes.

These things show sufficiently that the discovered building cannot be older than about 200 B. C. I have conjectured, therefore, that after the savage destruction of Thermos by Philip V in 218 and 206 B. C. the Ætolians rebuilt an older temple with the material of the destroyed monuments. But of what sort was this older temple? Fortunately the subsequent finds in the excavation give us a complete and clear idea of it.

All the floor of the temple I found covered by a thick stratum of ashes, coals, half-burnt beams, large nails, a countless number of roof-tiles and many fragments of cornices of decorated tiles, beside various other pieces of painted terra-cotta, such as cornices and artistic palmettes. Not a trace of a stone architectural member was found. These terra-cottas belonged manifestly to the sheathings of the temple, which was of wood. From the excavations of Sicily and of Olympia we knew of temples and other buildings (such as the Treasury of the Geloans, etc.) of porous stone with sheathings of terra-cotta. Now at Thermos we have found a temple entirely of wood with such sheathings.

One would think, perhaps, that these terra-cottas and the ashes, beams and roof-tiles belonged to the temple which, as I said above, the Ætolians rebuilt about 200 B. C., if not much later.

But this is impossible: 1, because the splendid workmanship and ornamentation of these terra-cottas has nothing in common with the very cheap restoration of the temple with miserable broken pieces of stones from other buildings. Ornamentation and technique resemble completely what we know from the Treasury of the Geloans at Olympia (about 600 B. C.) and from the most ancient temples of Selinous. 2, Because in the ashes was found a bronze stele damaged by fire, bearing inscriptions of the first half of the III century. 3, Because the roof-tiles are in form and technique and clay incomparably better than the roof-tiles of the buildings of Thermos which are of the III century. 4, For the following reason:—

FIG. 5. ARCHAIC HEAD OF A WOMAN (FACE-TILE)
FIG. 6. HEAD OF A MAN (V CENTURY)
FIG. 7. HEAD OF A WOMAN (V CENTURY)
FIG. 8. HEAD OF SEILENOS

Outside of the eastern, northern and western stylobate and always immediately beside it were found many dozens of upright cornice tiles with low-relief heads of men and women of the archaic type of the VI century B. C. and some heads of Seilenoi [Figs. 5, 6, 7, 8] and also a few heads of men and women of the V century B. C. Beside these were very many fragments of clay tablets with scenes, 5 of which have been fitted together, likewise of the technique of about the middle of the same VI century. They are in size nearly a meter in length and breadth and 5 to 7 centimeters (about 2½ inches) in thickness.

It is therefore unquestionable that all the finds of the thick stratum of ashes and coals which covered the floor of the temple belong to the older building.

This cannot be later than about the middle of the VI century B. C., to which belong the most of the face-tiles, and it was entirely of wood. The painted tablets were its metopes wedged in between beams. The triglyphs here must also have been of wood with sheathing of terra-cotta.

A fragment of the metope which represents two female forms holding something before them is shown in figure 10. Above the head it bears the inscription Χελίδρόν, (i.e. Χελίδών, Swallow, probably the woman's name.—A. S. C.)

After the burning and destruction of the temple in 218 or 206 the Ætolians built on the same site as that of the old temple a cheap restoration. Of what sort this was we do not know, for nothing has been preserved of it except the stylobate, the walls of the cella and the lowest drums of the columns of the peripteros.

However, that the older temple of the VI century was also peripteral and of exactly the same size is shown by the metopes and the place of their discovery as well as that of the upright tiles. I consider it indeed most probable that some bases of the wooden columns of the peripteros of the older temple are preserved in the western stylobate. For these bases resemble the bases of the wooden columns of the Homeric palace of Tiryns and those preserved on the acropolis of Athens beside the Erechtheion within the old temple of Athena.

In Ætolia in the V century B. C. the people still lived only in unwalled villages and were still so rude and uncivilized a people that Thucydides [3, 94] says that the Eurytanes, the largest tribe of the Ætolians, "were most unintelligible in tongue and eaters of raw flesh." And yet even here at a quite early date, i. e., at the beginning of the VI century, Greek art had reached its height as in the then most splendid centres of Greek civilization, especially Corinth.

Until but a short time ago we knew this art really only from the colonies in Sicily and lower Italy. Its influence was great also in Etruria. Already about 600 B. C. it had been carried thither by the Corinthian Demaratos, who was accompanied by the artists Eucheir and Eugrammos.

But in all the journeying of their trade to the West the Corinthians must have carried with their colonies and their trade also this art. From the coast of Ætolia where they had their trading-posts it was carried over to Thermos. Corinthian artists must have established it here also, bringing over the moulds all prepared for the face-tiles and sketches for the paintings. Indeed moulds were found at Thermos. The clay is the local clay of Thermos, but for the surface they used a thin layer of the beautiful, clean, whitish-yellow clay of the well-known Corinthian earth.

In the tradition in Pliny [Nat. Hist. 35, §151] about the Sikyonian Boutades, who invented at Corinth the art of fashioning figures in clay, is hidden an undoubtedly historic truth. And the use of wood for the construction of the most ancient Greek temples finds its clearest proof in the temple of Thermian Apollo.

After the floor of the temple had been carefully cleared of all the remains of this old temple of the VI century, I noticed under the eastern wall of the cella rather near the opisthodomos a great pile of ashes mixed with an immense number of burnt bones. Removing these ashes gradually I kept on to a depth of about two meters. The earth below had been changed into brick by the action of the fire, for the soil of Thermos is all red clay mixed with very small particles of iron pyrites. I examined the bones and found that they were all of domestic animals and fowls.

So great a heap of ashes with an immense number of such bones it was not possible to explain otherwise than as an altar. This altar then existed

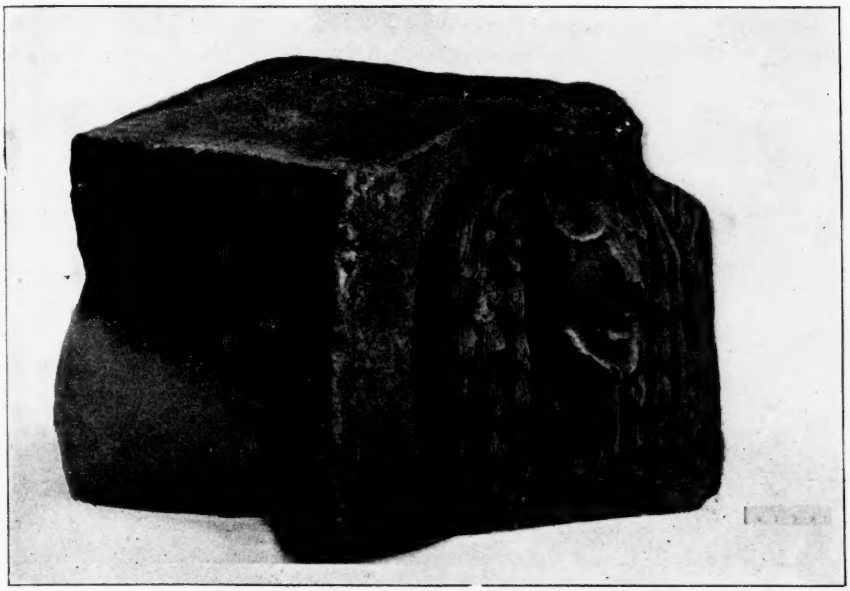


FIGURE 9. ROOF-TILE WITH THE MOST ARCHAIC HEAD

first and later the temple of the VI century was built over it. In this heap I found also many bronze objects such as horses (in spans), wheels of little chariots and idols such as those known from the altar of Olympia, as well as some small fragments of geometric vases.

I continued the excavation over the whole extent of the temple and outside of it under the floor and everywhere I found an extensive stratum of similar ashes and numberless fragments of burnt bones. It is plain, therefore, that gradually the ashes spread out from the altar and were scattered to a considerable distance, forming quite a thick layer. In all this stratum of ashes I found fragments either of the cheapest vases, such as those called "Lydian" by Schliemann, or of geometric pottery. I found also a bronze sword and other swords of iron.

Up to this point the matter was clear. There existed here previously, as we have said, an altar, just as in the Hera temple at Olympia. Afterward the temple of the VI century was built upon its site.

But the excavation showed also another thing.

Under the temple of the VI century I found walls forming a long building. Its orientation is not exactly the same as that of the temple. It forms a long hall with a kind of vestibule at the northern end.

What was this building? I conjecture that it was the oldest temple built in this place. And thus we can conclude as follows as to the order of the buildings here: First and in the oldest times there was an altar, perhaps near the sacred tree within the sacred grove where the earliest inhabitants worshipped their god without any image, without any temple. Secondly, there was built at some period between say the X and VII centuries the temple of which nothing has been preserved but the walls as they appear in the plan. Thirdly, there was built over it in the VI century the temple

from which we have the terra-cotta sheathings, the metopes and the face-tiles. Fourthly, after the burning of this in 218 or 206 the Ætolians rebuilt it again, and of this last building are preserved the stylobate, the few column-drums and the walls of the cella.

That the Ætolians built buildings at Thermos also in the VII or VIII century is witnessed by the colossal tiles, one of which is shown in figure 9. I found them near the temple, but their form, size and technique is wholly different from that of the roof-tiles of the temple of the VI century. The face in figure 9 is of the type of the Daidalean statues. Likewise I found a stone base for a wooden column of very great diameter, and among these tiles a massive terra-cotta triglyph of similar technique. These tiles are of the local clay, but have a very thin layer of white earth as a kind of coating on which were laid the colors.

FIGURE 10. FRAGMENT OF A METOPE

The elliptical building seen in figure 2 is older than the temple of the VI century, because its walls extend under this temple. In it I found 3 graves of burned bodies and fragments of geometric vases. In one grave I found also a golden tettix, evidently from the hair of a woman. This building resembles the bouleuterion (council-hall) of Olympia.

It is worthy of mention that also around the most ancient temple, surrounding it in an ellipse, are to be seen circular stone bases for wooden columns. Could this have been a kind of primitive colonnade of that most ancient temple? So much only is certain, that this elliptical peristyle has no connection with either the temple of the VI century or the altar.

Figure 4 shows an ancient reservoir in the bottom of which springs abundant water. It was not a mere basin but a spring, and it appears that they drew the water from above.

The existence of both statues and reliefs of terra-cotta is proved by various fragments of them which have been found. Perhaps, indeed, the pediments of the temple of the VI century had terra-cotta statues, as I conjecture from certain finds. Not a single trace of stone sculpture was found anywhere in the sacred precinct.

In regard to the inscriptions discovered I observe that none goes back farther than the first quarter of the III century, if I except that in which Lysippos is mentioned as having made the statue. Only on a fragment of a stone jar (pithos) I found the remains of an inscription, probably a name, in the oldest Corinthian characters. The E has the form (X). The dialect of the inscriptions—the most are decrees of *proxeny*—is the koiné with a Doric tinge. The most important of all is the inscription on the bronze stele, which bears the title: *Compact and Alliance between the Ætolians and the Akarnanians.*

* * * *

## ARCHAEOLOGICAL HISTORY OF OHIO*

UNDER this title the Ohio Archæological and Historical Society has just published a volume of seven hundred and seventy-six pages, prepared by Mr. Gerard Fowke. In addition to thorough acquaintance with the literature of the subject, Mr. Fowke has the advantage of being a practical surveyor and of having spent much time in the actual survey of the remarkable mounds and earthworks which are found in Ohio. The number of these mounds is said to exceed 10,000; while in extent and complication of structure the earthworks exceed all others found in the United States. Naturally the mystery attending these prehistoric structures has attracted the attention of a great variety of writers, many of whom have formed theories concerning them which have little connection with the facts themselves. It was with the purpose of sifting these theories and getting at the regular facts which have been brought to light by competent explorers that this volume was prepared. A good share of the work of Mr. Fowke has therefore been to correct the errors concerning them which had become current, and to dispel the illusions freely indulged in by the majority of those who have written upon the subject.

A prominent error respecting the earthworks and inclosures relates to the mathematical accuracy of their construction. None of them are laid out with sufficient regularity to imply the use of anything but the rudest methods. Their squares are not squares, and their circulars are far from being regular. Nor is there any evidence of the employment of any tools more effective than rough stone implements, or the employment of any means of transporting the earth other than baskets. In all cases, also, the material for the earthworks has been obtained from the immediate vicinity.

Extensive as the works are, their construction, he thinks, is not beyond the ability of a moderately sized Indian village during a comparatively short period of time. The Fort Hill embankment is estimated to contain 50,856 cubic yards of material. With the means at their disposal, 250 Indians could have easily constructed this "inside of 6 months."

**Archæological History of Ohio. The Mound Builders and Later Indians.* By Gerard Fowke. Published by the Ohio State Archæological and Historical Society, 1902.

Nevertheless, these structures may well continue to excite the wonder of archæologists. Fort Ancient, in Warren County, is an irregular promontory 250 feet above Little Miami River, surrounded by walls and earthworks measuring 18,712 feet in length. Fort Hill, in Highland County, is a flat-topped summit of 35 acres, completely surrounded by walls and earthworks measuring 8,582 feet in length. The stone fort at Glenford, Perry County, contains 20 acres, at the summit of a hill 300 feet above the surrounding level. The fortified hill in Hamilton County contains 12 acres; a similar one near Granville, Licking County, contains 18 acres; one in Butler County, 28 acres; one in Miami County, 18; and another near Dayton, 24 acres.

Of the inclosures upon low lands, those of from 3 to 5 acres are too numerous to mention; while one in Green County has 12 acres; one in Franklin County, 8 acres; one in Montgomery County, 31 acres; one in Butler County, 95 acres; one in Clermont County, 50 acres; one in Ross County, 111 acres, besides two others nearly as large, and 8 others ranging from 13 to 28 acres each, and the complicated works of the Harkness Group inclosing more than 70 acres. Indeed, in Ross County, for 12 miles along the valley of the Scioto, and 6 miles along Paint Creek, there is a continuous succession of extensive and complicated earthworks.

In Pike County the combination of square and circle joined by parallel embankments includes more than 30 acres. Near Portsmouth extensive and complicated earthworks include areas of 35 acres connected by parallel embankments extending to the Ohio River, with corresponding ones upon the Kentucky side. The symmetrical works at Marietta include squares of 50 and 27 acres, with mounds of various shapes and a graded way leading to the Muskingum River. In Newark, Licking County, "mile after mile of embankments, circles and other geometric figures, parallels, lodge-sites, and mounds, covering an area of more than 4 square miles, amaze the archæologist and curiosity seeker alike as they spend hours and days in traversing the ground in every direction, contsantly finding something worthy of investigation and description."

The most remarkable effigy mound is the Serpent of Adams County, which has been explored and restored by Professor F. W. Putnam, and presented to the State of Ohio. This is situated upon a rocky promontory overlooking Brush Creek, and has a total length, when measured along all its coils, of 1300 feet. Near Granville, Licking County, there is an effigy 250 feet in length, representing probably an opossum, though it was formerly supposed to be an alligator; while near Portsmouth there is an effigy 105 feet in length supposed to represent a bear.

From this simple but incomplete enumeration of facts it is clear that the mounds and earthworks of Ohio have justly excited the interest which has been aroused by them. But this interest has not led to any satisfactory solution of their purpose or origin. The result of Mr. Fowke's discussion is almost purely negative, showing how unsatisfactory every theory is. His conclusions are that the mounds which were supposed to be for the purpose of signalling from one prominent point to another would be of little service for that purpose; that the extensive earthworks upon the low lands are neither appropriate for fortifications of defense, for the support of temporary structures for habitation, nor for the promotion of religious cere-

monies. But the fortified hilltops were adapted to be of service for temporary defense. They are, however, ill adapted for sustaining long sieges, on account of the impossibility of obtaining water.

The most probable theory for the most of the mounds is that they are the burial-places of distinguished members of the tribes. One of these, the Hopewell group of mounds in Ross County, has yielded the most remarkable collection of implements and ornaments supposed to have been buried in honor of the dead. Eight thousand one hundred and eighty-five flint discs, each weighing about one pound, the material of which came from more than 200 miles to the southwest, were, however, probably cached to be worked over into implements. But various ornaments were doubtless for memorial purposes. Among these were large numbers of spool-shaped copper ear-ornaments and various other ornaments of copper wrought into tasteful shapes. Numerous thin pieces of copper were cut into the shape of the Swastika cross; while pieces of mica were cut into fair resemblances to fish. A skull of a skeleton was covered with a wooden head-dress with branching horns like the antlers of a deer, all encased in thinly beaten copper. Large numbers of finely wrought obsidian arrowheads and spearheads were also found, together with shell ornaments from the Gulf of Mexico.

These discoveries are doubly interesting for the light they shed upon the extent of the commerce of that time. The flint discs found in such large numbers in the Hopewell Mound are supposed by Mr. Fowke to have come from the vicinity of Louisville, Ky. The mica probably is from North Carolina, the shells from the Gulf of Mexico, the copper from Lake Superior, and the obsidian from the Yellowstone Park, or from some place equally distant in the southern part of the Rocky Mountains. The skill shown in the manufacture of the ornaments is such that some at first maintained that they were machine made and must be of European manufacture. But closer examination demonstrated that they were hand made, and that there was no reason to doubt their native origin.

The wonder in the study of all these remains, (both the monuments themselves and the implements) is that so much could be done with the clumsy tools at the disposal of the Mound Builders. There is no indication of their having used iron or of their having melted copper. All the copper implements and ornaments were hammered into shape, but the hammering must have been done by pebbles rounded in the streams or worked into shape by flaking and grinding. The dirt of which the mounds and earthworks were made must have been loosened by stone implements, and the forests cleared by building fires at the base of the trees and removing the charred portions by the rudest means.

The Mound Builders, like all established tribes, knew how to make fire by friction, and were very skillful in the application of fire to various purposes. At Flint Ridge in Licking County, for instance, 100 acres have been dug over to find the veins of flint which occur, and deep holes excavated in the solid rock to obtain material best fitted for use. Some of these pits were from 12 to 80 feet in diameter and 20 feet in depth. The work was effected by building fires upon the surface, and then throwing water upon the rock while it was hot, causing it to shatter; when the fragments were removed, and fire and water again applied.

The nearest approximation which can be made to the age of the earthworks is that they are older than the period of the discovery of America by Columbus. The efforts to estimate the antiquity earlier than that date from the size of the trees and from the distribution of the different kinds of trees is thought by Mr. Fowke to be futile. For the origin of the Mound Builders Mr. Fowke is inclined to look to the various tribes of Indians which have developed in the Mississippi Valley, and does not think it necessary to attribute them all to any one tribe. The hill fortifications may well represent temporary places of defense constructed by more warlike tribes from the north, while the inclosures in the river valleys were connected with the more permanent residences of tribes that had become sedentary in their habits. To maintain this theory, Mr. Fowke dwells at great length upon the praiseworthy characteristics of the Indians, showing from a vast accumulation of statistics that they are more industrious than they are generally reputed to be, and instancing such remarkable characters as Tecumseh, Pontiac, and Joseph to show the possibilty of organized efforts sufficient to accomplish all the results apparent in the mounds of the Mississippi Valley.

It is well to have this careful collection of facts bearing upon every side of the problem of the Mound Builders, even though the results are mainly negative. There remains yet a vast amount of work to be done in exploring other mounds and earthworks, and in comparing material already in hand with that which is being collected in other parts of the world. We think Mr. Fowke fails to recognize the full significance of various striking resemblances between these American relics and those from other parts of the world. The Serpent Mound can scarcely be thought to be an original invention. The Swastika cross has been traced by the late Dr. Thomas Wilson well nigh around the world, being found in greatest profusion and variety in the earliest ruins of ancient Troy; while the exact resemblance between the palæolithic implement found by Mr. Mills in Newcomerstown, Ohio, and others found in the valley of the Somme in France could scarcely have originated by independent invention.

But Mr. Fowke has had full opportunity to give his own interpretations and publish his own views upon these controverted questions, and has produced a volume which is well worthy of the enterprising Society which is setting about the more systematic and thorough exploration of the antiquities of the state.

# Notes

THE SULTAN HAS AT LAST GIVEN HIS PERMISSION to the Danish expedition to excavate on the Island of Rhodes. The archæologist, Dr. Blinkenberg, who is in charge of the expedition left Copenhagen in May for Lindos where the excavations are to be carried on. This town is on the northeast coast of the island which is rich in ruins.

SIGNOR BONI HAS RECENTLY made an important discovery in the Roman Forum bearing on the question as to the Aryan origin of the founders of Rome. It is a "prehistoric tomb, believed to date approximately from the VIII century B. C., containing a large urn, or *dolium,* of black ware full of calcined bones, and several reticulated, egg-shaped vases, besides a bowl and a cup with horned handles like those found in the terremare of the Bronze Age. The tomb is situated in the bed-clay some 12 feet below the level of the Sacred Way, opposite the Regia, and close by the Temple of Antoninus and Faustina."

THE LAKE DWELLINGS discovered at Roulers in Belgium are of especial interest because of the great variety in the remains found, which indicate that the locality was inhabited by Lake Dwellers from neolithic to quite modern times. The finds include flints, discoid scrapers, arrow-heads, chips, polished axes, bronze ornaments, wheel made vases, and a bronze coin bearing the impress of the Emperor Trajan (98 to 117 A. D.), a blue glass bottle and varnished pitchers which do not date earlier than the XIV or XV centuries. A skeleton found here has been studied by Dr. E. Houzh who thinks that it belongs to the "brachycephalic neolithic race of ancient Belgium."

THE GERMAN ORIENTAL SOCIETY has already brought to light 400 inscribed clay slabs from the center of the ruins of Babylon at Nischan-el-aswad. Two of these inscriptions have been deciphered. One is an ancient dictionary of Babylonian cuneiform characters and so is of great value. The second contains the "litany" which was chanted by the singers of the Temple of Esagila on the return of the god Marduk to his sanctuary. Marduk or Merodach, was the son of Ea, and one of the 12 great gods of the Assyro-Babylonian Pantheon. In Jeremiah l. 2, he is mentioned in connection with the prophesies of the destruction of Babylon. The Society has made other important discoveries among which is a "Temple of Ador or Nineb, the Tutelar god of physicians, hitherto quite unknown." Also an amulet to protect the wearer from demons.

IN NEW MEXICO there are a number of stone circles which Mr. A. M. Swan describes in the *American Antiquarian.* Concerning the one in Socorro Co. he says: "The interior of this circle is about 40 feet and has been surrounded by an outer circle. The inner circle is in the best state of preservation, most of the upright enclosing stones being still intact. * * * In the center of this circle there are 4 upright stones forming the 4 corners of a square which have been capped by a large flat stone now broken in two but the edges are still supported" forming what the English would call an Altar Stone. Others in Bernalillo Co. and one in Navajo consist of lines of upright stones. In the latter place the stones are set at equal distances from each other and cover, according to the survey by Col. Walter G. Marman, nearly 100 acres. These rows are parallel and run east and west.

MR. JOSEPH OFFORD in the *Proceedings of the Society of Biblical Archæology* for March calls attention to the fact that although two-wheeled chariots have usually been considered as of earlier date than four-wheeled ones, yet in the oldest representations of chariots we have some examples of those with four wheels. He mentions two Babylonian cylinders in the British Museum showing four-wheeled chariots drawn by 4 horses, another cylinder belonging to Dr. Hayes-Ward which shows a similar chariot, and a drawing found on the bandages of an Egyptian Mummy showing a funeral boat supported on 4 wheels.

IT IS GRATIFYING to note that the newspapers in our Southwest are taking up to some extent the cause of the protection of their ancient pictographical and other prehistoric records. These are so important that public sentiment not only in the Southwest, but all over the country should be aroused for their protection. We heartily endorse the statement made by Mr. E. S. Curry that "In the very near future these records will be appreciated, and will be justly regarded as of equal value and importance with the ancient records of Egypt and Nineveh." It is to be hoped that all educated people will bring pressure to bear on the legislatures of our several states as has been done in Ohio so that laws may not only be enacted, but enforced for the preservation of these historical records which in a few years, unless something is done, will be obliterated beyond the possibility of replacing or restoring. We would call attention again to the suggestion for a national law for the preservation of our antiquities which was published in the first article of the January issue of RECORDS OF THE PAST.

IN THE FIRST CHAPTER of Professor Edward Dickinson's most interesting and instructive volume on "Music in the History of the Western Church," are some interesting things relating to the light shed upon ancient music by the character of the instruments which are found sculptured upon ancient monuments.

That music was always performed in unison and octaves, as has been generally believed, is, however, not probable. In view of the fact that the Egyptians possessed harps over 6 feet in height, having 12 or 13 strings, and played with both hands, and that the monuments of Assyria and Egypt and the records of musical practice among the Hebrews, Greeks, and other nations show us a large variety of instruments grouped in bands of considerable size, we are justified in supposing that combinations of different sounds were often produced. But the absence from the ancient treatises of any but the most vague and obscure allusions to the production of accordant tones, and the conclusive evidence in respect to the general lack of freedom and development in musical art, is proof positive that, whatever concords of sounds may have been occasionally produced, nothing comparable to our present contrapuntal and harmonic system existed. The music so extravagantly praised in antiquity was, vocally, chant, or recitative, ordinarily in a single part; instrumental music was rude and unsystematized sound, partly a mechanical aid to the voice and the dance step, partly a means of nervous exhilaration. The modern conception of music as a free, self-assertive art, subject only to its own laws, lifting the soul into regions of pure contemplation, where all temporal relations are lost in a tide of self-forgetful rapture,—this was a conception unknown to the mind of antiquity.

THE BIRTH-PLACE AND ONE OF THE BURIAL-PLACES OF BUDDHA although known for some time have but recently been brought to the attention of the general public. According to the Book of the Great Decease, Buddha was cremated and his ashes divided into eight portions which were distributed to the King of Magadha and the "seven free clans, including the Sâkyas, who occupied the adjoining country." Each of these clans put up a stupa, or cairn and established a festival in his honor. Mr. Wm. Peppe in 1897 excavated a ruin stupa in which he found beneath 18 ft. of solid brick work a stone slab which proved to be the cover of a stone box. This was broken but fitted so perfectly into a groove around the sides of the coffer that he could remove it without injuring the contents of the box, which was hollowed out of a solid block of sand stone and weighs 14 cwt. "Inside this massive and costly coffer were 3 stone urns or vases, a stone box like a jewel-casket, and a crystal bowl, all intact, together with fragments of what had been wooden vessels of the same kind. * * * In the vases were fragments of bone, a quantity of

dust and fine ash, and several hundred small jewels exquisitely carved * * * * and other minute objects in gold and silver." The identification of this spot as one of the burial-places of Buddha, was proved by an inscription carved on one of the urns. *This place of deposit for the remains of Buddha, the August One, is that of the Sâkyas, the brethren of the Distinguished One, in association with their sisters, and with the wives of their sons.*

In Nepalese Tarai an Asoka Pillar was discovered some years ago, and some of the inscriptions copied. Later the pillar was excavated and an inscription in 5 lines of Asoka letters was uncovered. The meaning is as follows: *Devânam Piya Piyadassi* [epithets of Asoka] *came himself in his twenty-first year and paid reverence here. And he put up a stone pillar, with a stone horse on it, on the ground that the Buddha, the Sâkya sage, was born here. And the village Lummini, since the Exalted One was born there, is hereby relieved of its tax of one-eighth share of the produce.* This places very accurately the birth-place of Buddha as recorded about 3 centuries B. C.

TREPHINING IN THE SOUTH SEAS. A short article by Rev. J. A. Crump on Trephining in the South Seas as carried on at the present time is of great interest and importance, bearing on our study of the prehistoric skulls which have been treated in this way. The paper was presented before the Anthropological Institute of great Britain and Ireland, and the following quotation is from their Journal.

"My previous inquiry was limited to New Britain itself, and in that part of the district the operation of trephining is practiced on the skull solely in cases of fracture.

"In the native fights the sling is the most formidable weapon used, a smooth stone as large as a pullet's egg being thrown with moderate accuracy but considerable force. A blow from a sling-stone is generally the cause of the fracture for which the operation is found necessary; the depressed portions of the bone or hæmorrhage beneath the skull causing compression, and death almost invariably results if the injury is not attended to. Injury caused by the stone-headed club is almost instantly fatal, but the flat two-edged club is not so deadly and permits of an occasional operation.

"The man who performs the operation is a wizard or 'tena-papait' of the tribe or district, using a piece of shell or a flake of obsidian for the trephine.

"An incision is made over the seat of fracture generally in the shape of a Y or V, and so perhaps some loose fragments are picked out with the finger nail, and while assistants hold back the scalp, the fractured bone is scraped, cut and picked away, leaving the brain exposed to the size of half-a-crown. Then all loose pieces having been removed, the scalp is carefully laid down and the wound bandaged with strips of banana stalk about 4 inches wide. These strips are when dry of a spongy nature, the water which formerly filled the cells being replaced by air. Moreover the inner surface is silky to the touch and forms an admirable dressing for tender surfaces. It is astringent in its action and non-absorbent, all discharge escaping below the bandage. Sometime a few bruised leaves are supplied before bandaging. The patient is generally insensible from the time of the injury, and, if consciousness returns during the operation, soon faints away again.

"In 5 or 6 days the bandages are renewed and in 2 or 3 weeks a complete recovery is the result. The number of deaths is about 20 per cent., most of these result from the first injury and not from any complication after the operation. Nearly all deaths take place during or immediately after the operation, and I am assured that after the patient once becomes conscious he never fails to make a good recovery.

"I have recently discovered that on New Ireland (Neu Mecklenburg) the operation is performed not only in the case of fracture but where there is epilepsy or certain forms of insanity as a result of pressure on the brain. I have in my possession a skull which has been successfully trephined in not less than five places, the man meeting his death some years after the last operation by a blow from an ax. This man suffered very severe headaches with local throbbing. The operation was performed each time in the region of the pain, and though no cure seems to have been effected, the operation was at any rate perfectly successful.

"The most common form trephining takes on Gerrit Demp Island and the central part of New Ireland is cutting 2 or 3 channels down the forehead 3 or 4 inches long. This is done for headache and what is described as a beating or plucking sensation.

"There seems to be some benefit in cases of trephining for epilepsy at least for a time. One native at Falabog on the west coast of New Ireland, with whom I conversed, at being trephined on the top of the skull for the malady had had no recurrence since the operation. In no case is it thought necessary to avoid the course of the sutures in performing this operation.

"After trephining has been performed there is a frequent partial temporary paralysis which almost invariably passes away, though in a few cases it is permanent. Idiocy is an occasional result also. But the natives affirm that while the cure of insanity and epilepsy are many, the instances where either malady supervenes after the operation are exceedingly few.

"I have the pleasure of" * * * having "three skulls bearing indisputable evidence of the performance of the operation and its success.

"No. 1 is a skull of Toara, a native of the Kabakada on the northern coast of New Britain, and was struck with a sling-stone and trephined. He never became conscious and died two hours after the operation had been performed. The man who threw the sling-stone is still living and also the 'tene-papait' who performed the operation. From the latter I got my information. The marks of the instrument are easily visible.

"No. 2 is the skull of Toruruke, a native of Kabakada, and shows the growth of new bone. He was trephined about 7 years before his death.

"No. 3 is the skull of Tighan from the village of Olotai, situated about 6 miles inland from Ralabog on the west coast of New Ireland. This operation was performed to cure headaches. There are many people in this village who have been trephined. It has become fashionable, and a handsome girl or boy is generally persuaded to submit to the operation as an aid to longevity, there being no absolute need for its performance."

In the discussion which followed the reading of this paper Mr. Victor Horsley expressed the opinion that in the Peruvian skulls where trephining had been done in the frontal region, it was for curing headache, as suggested by that method of treatment among the South Sea Islanders.

SOME NATIVE LEGENDS from the Southern New Hebrides are translated in the last issue of the *Journal of the Anthropological Institute of Great Britain and Ireland*. The striking resemblance to some of our nursery stories, such as Jack and the Bean-stalk will be noticed in the following specially interesting ones:—

### No. I. Moshikishiki and Taposiesi

Taposiesi[1] was a devourer of man, who devoured all the big people, and kept the children in a marae[2] in Pau[3] until they were big, and then he ate them. One day he went up to Kirisavini[4] and met Moshikishiki, who made himself young like a boy, and had been sharpening a stone ax. Taposiesi asked him, "Whence came you?" "I was playing," he answered. "Come down to your brothers in the marae." They both went down and heard the noise of the boys playing inside.

Moshikishiki was put inside too. Taposiesi went away to his plantation. When he was away Moshikishiki asked the children what they were doing. "Playing just waiting until our grandfather returns." "He is just deceiving you," said Moshikishiki; "he is feeding you up until you get big, and then he will eat you." He then took them away down to Tavesua.[5] Taposiesi hearing no sound from the house in the marae, came down and found no one inside. "What has become of my grandchildren," he said. He went down to the cliff, and saw them on the beach below. "What are you doing down there, my grandchildren?" and he went down after them, hoping to inclose them inside the rocks. But Moshikishiki cut the rock at Masuataga,[6] and he and the boys went out towards the sea. Taposiesi followed. They went on with Moshikishiki at Taringakasi, and went on to Sia, and climbed up Feiava, and went on towards Mounga.[7] They climbed tamakopu.[8] The boys became the seed and Moshikishiki the core of the breadfruit. Taposiesi said, "This is my breadfruit," and went to cut firewood to cook it. When he was making the fire the boys watered it(urinated) and put it out. He went away to get some food. When he was away they left tamakopu and climbed up by means of the tarie[9] up into the sky. When Taposiesi returned he found no one in the breadfruit tree, but saw them in the sky. "How did you get up there my grandchildren? Give me the vine (or creeper) that I may climb up." They threw it down to him and pulled it up some distance and then let go. "How did you let me fall," asked Taposiesi. "You did not take a good hold." He tried again, and fell, and laid down. One of the boys came down like a fly (tarango[10]) and examined him. He went up and said, "He is dead." Another came down like a large black ant (taroata[11]) and examined him. He passed through me, entering at the mouth. "He is dead," he said. The other boys came down. "Where do you stay?" asked Moshikishiki of one. "I am a man of Mounga." "You will stay in Mounga." "What is your land?" he asked of another "Sia." "Then you will stay in Sia." "What is your land?" "I am a man of Asoa." "You will go to Asoa." "What is your land?" "Akana." "Go." "What is your land?" "Matangi." "Go." What is your land?" "Raro." "Go." What is your land?" "Pau." Then we two will go." And thus Moshikishiki took up his stay in Pau.[12]

## No. II. Tangaroa, the Origin of Cocoa-nuts

Tangaroa[1] lived in Tavakosura in Aniwa. There was a woman, named Keke, in the district of Ravaru. Tangaroa was one day following the course of the vine of a keire,[2] and Keke met him. He took her for his wife, and they had a son, and they lived in Tavakosura. Tangaroa now and again left Aniwa and went over to Rupapu[3] and to Nahabusima[4] and to Namera[5] and to other parts of Tanna. When he went away, he left part of him behind as he was big and long like a house.[6] Once he went away altogether, and then the woman took her child and returned to Ravaru. When Tangaroa returned to Tavakosura, he found that his wife and child were gone. "Where are they two gone to?" And he blew a Pan's pipe. "What is that?" asked his wife of those round about. "Oh! it is only the wind blowing through the toa[7] leaves." The whistling continued, and she began to clean up the premises, and swept it all round. Then he came in gradually and filled up the space. She got some kava,[8] and some other roots, and chewed them for him to drink. He said, "if when I drink it, I live, then we three shall stay together, if not, you will cut off my head, and bury me." He drank the kava and died at once. She cut off his head and buried the body, and then buried the head in a heap of rubbish in the premises. It grew and became a nabuau.[9] A fence was made round it. It grew larger and became a niu,[10] and a larger fence was put round it. Keke gave her son the cocoa-nuts that grew on it, and gave none to others.

Others ate the fruit of the fatau,[11] and the pau.[12] His mother told him not to give any of his food to others. One day he was out with other children, and he saw them eating puddings of this fruit. He asked them to give him one, and they refused. He said "I have a very good pudding myself." "Let us see it?"

they asked. He returned to his premises, and brought the cocoa-nut made into a pudding, and gave it to them. Each one took a bite of it, and they ate and ate until they ate off his hand. He went back to his premises crying. When his mother saw that his hand was bitten off, she was angry and pulled off the leaves of the cocoa-nut tree. She threw away tanojiro,[13] and they fell in Samoa, Rarotonga, Niu (Savage Islands), and thus these islands have large good cocoa-nuts, while bad ones have been left for Aniwa.[14]

### No. III. Tangalua and Seimata

Tangalua[1] had an Aniwan woman, Seimata, as his wife. She had a little boy. The Aniwans hated Tangalua, because, as they said, he was not a man but only a ghost.[2] So they killed him with a big dose of kava. Before he died he told Seimata to watch the place where he was buried, for something would grow there that would be food for her child. As Tangalua lay drunk with kava he wagged his tail[2] again and again, and died and was buried. Out of his two eyes grew a cocoa-nut tree.[3] But only Seimata and her child knew that its nuts were good to eat. One day Seimata left her little boy alone, eating a nut, and told him not to tell anyone where he got it. Some boys got him to show them the tree. They pulled nuts and ate them. One boy in his greed ate the points of his fingers. Seimata was very angry, and pulled up the tree and tore it to fragments. The wind scattered these among all the islands, so they all have cocoa-nuts now.

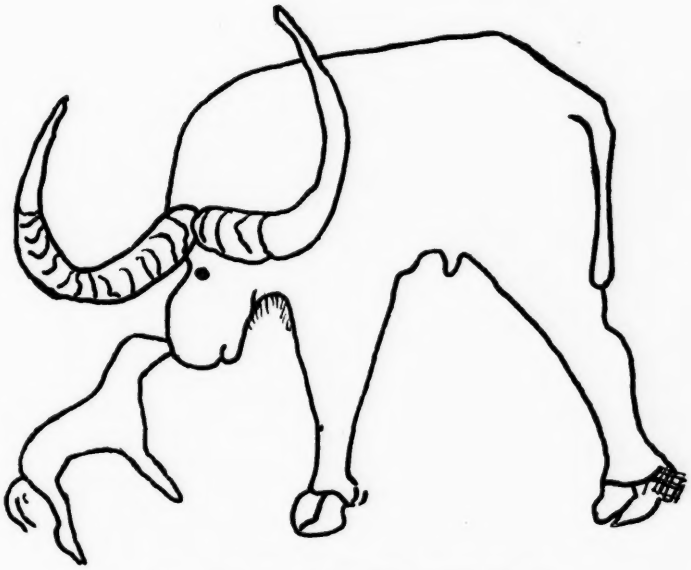
No. I. This story is told with very slight variation by the people of Aniwa. They give more detail of the attempts of Taposiesi to reach the sky.

[1]Taposiesi. I have been unable to trace this person in the eastern legends. [2]The marae is the open space in the center of a Polynesian valley. [3]Pau is a place in Futuna. [4]Kirisavini is a path leading to the great hill which forms the center of Futuna. [5]Tavesua is the landing-place near the mission station. [6]Masuataga is near the landing-place. [7]Taringakasi and Feiava are near the mission station and landing-place; Mounga is the central hill of Futuna. [8]In this and similar words ta is a definite article. Makopo is the bread fruit-tree; Samoan, maopa. [9]Tarie, the almond tree. [10]Tarango, the house fly; Samoan, etc., lango. [11]Taroata, Samoan loata, a large venomous ant. [12]Mounga, Sia, Asoa, Akana, Matangi, Raro, and Pau are the 7 districts into which the island of Futuna is divided. Sometimes the locative particle i is prefixed Imounga, Imatangi, at Mounga, at Matangi.

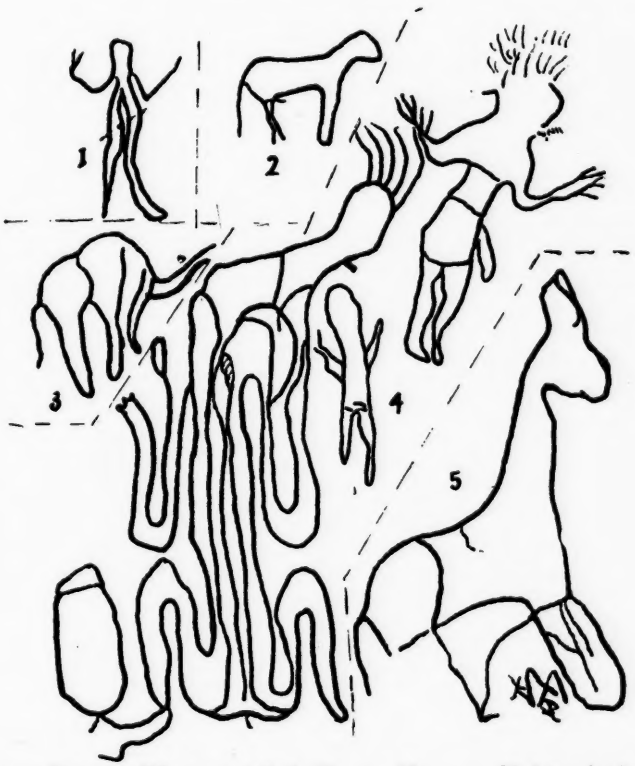
No. II. In Tanna a story of this kind is called Kawanangei. [1]Tangaroa is also called Teirauma or Lakeirea. [2]Keire is a tuberous plant with a trailing stem, similar to the yam. [3]Rupapu, Port Resolution, Tanna. [4]Nahabusima, Weasisi, Tanna. [5]Namera, Kwamera, Tanna. [6]Tangaroa was a gigantic eel or sea snake. [7]Toa, iron-wood (Casuarina). [8]Kava, Piper methysticum. [9]Nabuau, the sago palm. [10]Niu, the cocoa-nut palm. [11]Fatau is described as a tree like a tamano tree. What the latter is I do not know. [12]The Pau is a tree with a pear-like fruit, containing a hard unedible seed. [13]Tanojiro, the central leaves of the cocoa-nut palm; tano, its, belonging to it, jiro, innermost sprout; Samoan, tilo. [14]Rarotonga, cocoa-nuts are said to have sprung from the head of Tuna. He assumed the shape of an eel, and his head was cut off by his lover, Ina moe aitu. Twin cocoa-palms sprang from the 2 halves of his brain; one red, sacred to Tangaroa, the other green sacred to Rongo. The white kernel of a cocoa-nut, which was not to be eaten by a woman, was te roroo Tuna, Tuna's brain. [Gill, *Myths and Songs*, p. 77.] The conception of Tangaroa as a snake or eel does not seem to occur in Eastern Polynesia.

No. III. [1]Tangalau is the Tanna form of the word Tangaroa. [2]Because of his eel or snake-like form. [3]Cf. The Aniwa and Rarotongan version.

OUR KNOWLEDGE OF THE ROCK-PICTURES of Northern Africa has been greatly increased by the recent discoveries of M. Flamand, the reports of which have been published in the bulletins of the *Société d'Anthropologie de Lyon*.



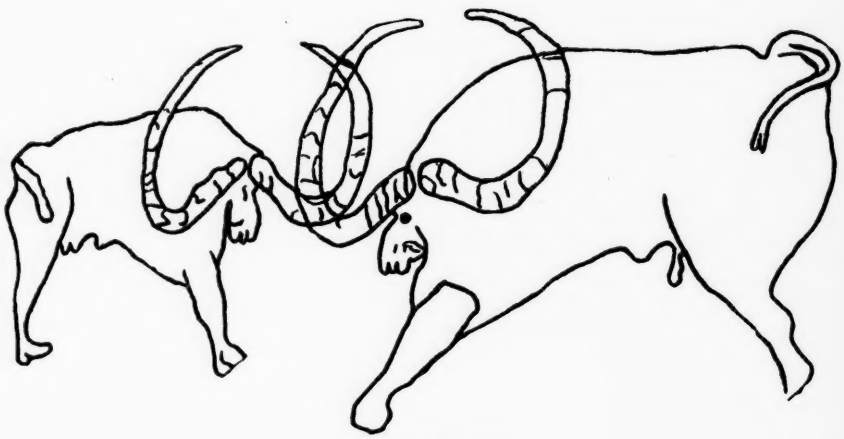
BUBALUS ANTIQUUS AND SOME SMALL ANIMAL




NEOLITHIC PICTURE (Mograret-et-Tathani) 1. Man. 2. Undetermined animal. 3. *Antelope gnu.* 4. Group of several persons. 5. Antelope or giraffe.

These drawings represent different epochs: 1. Prehistoric or neolithic; 2. "Protohistoriques," historic and modern. Concerning this first division M. L. Captain in *Revue de l'Ecole d'Anthropologie* for May 1902 says that some of these prehistoric (neolithic) pictures represent very large animals such as the rhinoceros, elephant and carnivorous animals. They are correctly drawn and seem to be reproductions of animals which the artist had actually seen. Among them is the drawing of a large species of buffalo which has entirely disappeared from the region but whose former existence there is known from his bones which are often found in the recent pleistocene deposits of the high plateau region of Algiers. To archæologists this fact shows the great antiquity of the drawings, while to the geologist or meteorologist, it indicates the recentness and extent of the climatic changes which have taken place in that region.

The animals pictured on these rocks are the *Bubalus antiquus* (a huge long-horned buffalo), elephant, rhinoceros, ox, wild boar, hippopotamus, carnivorous animals, horse, antelope, deer, giraffe, monkey, and man.



BUBALUS ANTIQUUS